

Appl. No. 09/663,593
Amdt. dated September 29, 2004
Reply to Office Action of August 25, 2004

Amendments to the Claims

1. - 15. (Cancelled)

16. (Cancelled)

17. (Cancelled)

18. (Currently Amended) A semiconductor structure, comprising:

a substrate of a first conductivity type;

a first buried layer of a second conductivity type disposed on the substrate;

a second buried layer of the first conductivity type disposed on the first buried layer, and separated from the substrate by the first buried layer;

an epitaxial region of the second conductivity type having a bottom surface disposed on the second buried layer, and further having a top surface;

a first deep via disposed through the epitaxial region such that a first electrical pathway is formed from the top surface of the epitaxial region to the first buried layer;

a second deep via disposed through the epitaxial region such that a second electrical pathway is formed from the top surface of the epitaxial region to the second buried layer;

a contact region of the second conductivity type disposed in the epitaxial region, the contact region having a top surface that is coplanar with the top surface of the epitaxial region; and

a protection region of the second conductivity type disposed in the epitaxial region, the protection region having a top surface that is coplanar with the top surface of the epitaxial region, and the protection region spaced apart from the contact region, and spaced apart from the first and second deep vias.

wherein the contact region and the protection region each have a greater doping concentration than the epitaxial region; and

The semiconductor structure of Claim 17,

wherein the protection region comprises a ring around the contact region.

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19. *(Previously Presented)* The semiconductor structure of Claim 18, wherein the first deep via and the second deep via are electrically coupled.
20. *(Previously Presented)* The semiconductor structure of Claim 19, wherein the first deep via and the second deep via are spaced apart from each other.
21. *(Previously Presented)* The semiconductor structure of Claim 20, wherein the semiconductor device is of the RESURF type, wherein the product of the thickness and the doping concentration of the epitaxial region is approximately 10^{12} atoms per cm^2 .
22. *(Previously Presented)* The semiconductor structure of Claim 20, wherein the epitaxial region has a thickness of approximately $9\text{ }\mu\text{m}$, and a doping concentration of 3.5×10^{15} atoms per cm^3 .
23. *(Previously Presented)* The semiconductor structure of Claim 20, wherein the first deep via and the second deep via are electrically coupled by a terminal disposed outside of the epitaxial layer.
24. *(Previously Presented)* The semiconductor structure of Claim 20, wherein the first conductivity type is p-type and the second conductivity type is n-type.
25. *(Previously Presented)* A semiconductor structure, comprising:
a substrate of a first conductivity type;
an epitaxial layer of a second conductivity type disposed on the substrate;
a drain region of the second conductivity type disposed in the epitaxial layer;
a protection region of the second conductivity type disposed in the epitaxial layer, spaced apart from the drain region, and comprising a ring around the drain region;
a backgate region of the first conductivity type disposed in the epitaxial layer, and spaced apart from both the protection region and the substrate;
a source region of the second conductivity type disposed in the backgate region;

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a deep via of the first conductivity type disposed in the epitaxial layer, the deep via providing an electrical connection between the backgate region and the substrate;

wherein the drain region and the protection region each have a doping concentration that is higher than the doping concentration of the epitaxial layer.

26. *(Previously Presented)* The semiconductor structure of Claim 26, further comprising a gate electrode disposed above the source region and the epitaxial layer, and electrically insulated from the source and epitaxial layer.

27. *(Previously Presented)* The semiconductor structure of Claim 26, wherein the first conductivity type is p-type and the second conductivity type is n-type.